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# Changes in Gastroenterology and Endoscopy Practices in Response to the Coronavirus Disease 2019 Pandemic: Results From a North American Survey



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**Keywords:** COVID-19; Endoscopy; Gastroenterology; Clinical Practice.

responses are presented in the [Supplementary Material \(Supplementary Figure 2\)](#).

**D**igestive manifestations appear to be common in patients with coronavirus disease 2019 (COVID-19).<sup>1</sup> Gastroenterologists will invariably come into contact with infected patients, and the risk of intraprocedural exposure is well established.<sup>2</sup> Recommendations have been issued to guide personal protective equipment (PPE) use<sup>3</sup> and the triage of procedural urgency,<sup>4</sup> among other operational considerations. In response, institutions providing gastroenterology and endoscopy services have taken urgent action to protect patients and staff, but the uptake and extent of these practice changes in North America is unknown. We conducted a survey of gastroenterology and endoscopy practices to assess the response to the COVID-19 pandemic across the continent.

## Methods

A Web-based survey was disseminated to gastroenterologists across North America. Distribution was achieved via en masse e-mail, social media promotion, and direct contact by 4 authors (NF, ZLS, SBW, and BJE). The survey consisted of 42 items, stratified into 6 categories: institutional demographics, changes in endoscopy practice, changes in clinical practice, changes in training, periprocedure screening for COVID-19, and changes in PPE practices. Detailed methodology is provided in the [Supplementary Material](#).

## Results

### Overview

Seventy-three individuals responded on behalf of their institutions, representing 62 US centers across 24 states and the District of Columbia and 11 Canadian centers across 5 provinces ([Supplementary Material](#) and [Supplementary Figure 1](#)). Most responding centers (63/73) were teaching institutions. Responses were submitted and/or updated from March 21 to April 17, 2020. Aggregate survey

### Changes in Endoscopy Practice

At the time of response, most centers (46/71, 65%) were operating at  $\leq 10\%$  of their normal endoscopy volume, with 18 centers (25%) performing approximately 25% of normal volume. Seventy-one of 73 centers (97%) had postponed screening colonoscopy. Of responding centers, 48 of 71 (68%) stated that they had no defined plan to address the procedural backlog once restrictions are lifted ([Figure 1](#)). Those that did have a plan favored weekend and after-hours endoscopy or stool-based testing. Twenty of 72 responding centers (27%) had adopted routine endotracheal intubation for upper endoscopic procedures.

### Changes in Clinical Gastroenterology Practice

Forty of 73 (55%) and 15 of 73 (21%) institutions reported that clinics were partly or fully closed, respectively. In response, all but 3 had implemented telemedicine visits (70/73, 96%). Approximately half of centers (33/70, 47%) reported conducting  $>75\%$  of visits via telemedicine ([Figure 1](#)). Fifty-four of 73 centers (74%) had adopted modified schedules, limiting the number of attending physicians in the hospital at any given time; a median of 3 staff physicians were expected to be simultaneously present (interquartile range, 2–4).

### Changes in Fellowship Training

Fellows continued to evaluate inpatient consults face-to-face in 47 programs (75%) and via electronic-only

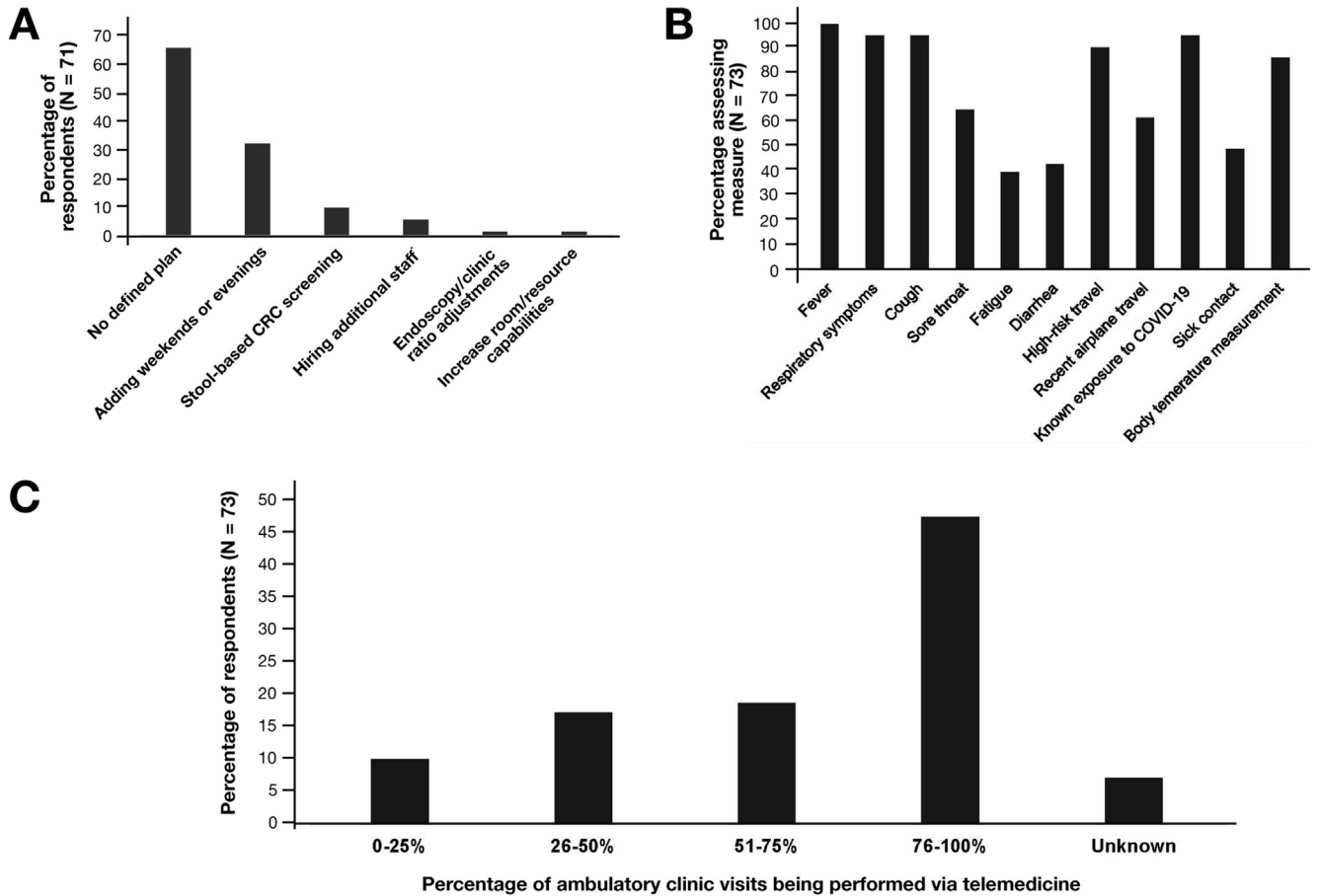
\*Authors share co-first authorship.

**Abbreviations used in this paper:** COVID-19, coronavirus disease 2019; PPE, personal protective equipment.

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**Figure 1.** (A) Institutions' plan(s) to manage the backlog of endoscopic procedures postponed during the COVID-19 pandemic once current restrictions on elective endoscopy are lifted. (B) Proportions of institutions screening for COVID-19 symptoms, exposure history, or performing body temperature measurements. (C) Proportions of institutions' ambulatory clinic visits currently performed via telemedicine.

assessment in 14 programs (22%). Only 3 programs still had fellows seeing clinic patients in person, whereas 39 (62%) had them seeing patients virtually. In contrast, 26 programs (41%) had limited fellow involvement in endoscopy for select cases, whereas 31 (49%) had eliminated their involvement altogether. Many (21/47, 45%) interventional endoscopy training programs had stopped training.

**Coronavirus Disease 2019 Screening**

The majority of responding centers (63/73, 86%) are screening patients for COVID-19 upon arrival to endoscopy units through symptom and/or exposure assessments (Figure 1). These screening measures had resulted in at least 1 procedure cancellation at 37 of 60 (62%) responding centers. Only 16 of 57 centers (28%) were contacting patients up to 14 days postprocedure to assess for de novo COVID-19 symptoms.

**Personal Protective Equipment Processes and Use**

Expanded PPE (beyond standard gown, gloves, and goggles) was being used in 63 of 73 (86%) institutions for

all endoscopic procedures, whereas 5 of 73 (7%) and 4 of 63 (6%) indicated that expanded PPE use was restricted to patients with suspected or known COVID-19, respectively. A total of 62 of 72 (86%) respondents indicated that they were concerned about their unit's PPE supply in the event of a case surge. In all comers to endoscopy (COVID-19 negative or unknown status), 69 of 73 (95%) respondents reported using face shields or goggles; 56 of 73 (77%), standard surgical masks; 49 of 73 (67%), hairnets; 43 of 73 (59%), N95 or filtering facepiece particles (FFP) masks; 40 of 73 (55%), double gloves; and 35 of 73 (48%), shoe covers. In high-risk or confirmed COVID-19 cases, 92% of responding centers reported using an N95 or FFP mask. Reuse of N95 or FFP masks was reported by 54 of 71 (76%) respondents.

**Stratified Analyses**

Over time, the use of N95 masks for all comers increased significantly ( $\chi^2 = 22.2$ ;  $P = .004$ ). A nonsignificant trend was observed in the increased reuse of N95 masks over time ( $\chi^2 = 20.7$ ;  $P = .06$ ). There were no other significant temporal trends. On univariable analyses, US centers (compared to Canadian centers) were significantly more likely to use hairnets ( $\chi^2 = 9.1$ ;  $P = .003$ ), surgical masks ( $\chi^2 = 4.1$ ;  $P =$

.04), and shoe covers ( $\chi^2 = 8.1$ ;  $P = .004$ ) in all comers and more likely to use hairnets ( $\chi^2 = 7.8$ ;  $P = .005$ ), N95 respirators ( $\chi^2 = 13.4$ ;  $P < .001$ ), and shoe covers ( $\chi^2 = 10.9$ ;  $P = .001$ ) in high-risk/positive patients. US centers were also significantly more likely to reuse N95 masks ( $\chi^2 = 19.3$ ;  $P < .001$ ). There were no significant differences in PPE practices between regions within the United States or between academic and nonacademic centers. Centers in the West were significantly more likely allow fellow participation in general ( $\chi^2 = 26.7$ ;  $P = .02$ ) and interventional endoscopy ( $\chi^2 = 15.1$ ;  $P = .03$ ).

## Discussion

Our study shows that institutional responses to COVID-19 have been variable, fluid, multifaceted, and substantial. Although most study centers reported expanded PPE use in all endoscopic procedures, the use of surgical masks vs N95 respirators varied. Increasing trends in N95 mask use were observed over time, and US centers were more likely to use these masks as well and hairnets and shoe covers. Although early evidence suggests that standard surgical masks may be sufficient in non-high-risk scenarios,<sup>5</sup> it remains critical to elucidate whether endoscopy produces respiratory aerosols fine enough to penetrate standard masks.

Triaging endoscopic procedures during the pandemic is also crucial, and professional societies have issued guidance on this matter.<sup>6</sup> However, the postponement of nonurgent endoscopy will result in a surplus of procedures when clinical operations normalize. Strikingly, nearly two thirds of respondents had no defined plan to address the backlog. Innovative approaches, such as revising CRC surveillance intervals for patients awaiting follow-up colonoscopy according to new multisociety guidelines, should be considered,<sup>7</sup> keeping in mind that resumptive strategies may be affected by numerous factors, including new postpandemic infection control precautions and whether a country has a single- or multiple-payer system.

This study provides a current and comprehensive snapshot of the changes that North American centers have implemented in response to the pandemic and—by reporting data on clinical, consultative, and training practices—expands on recent information by our Italian colleagues.<sup>8</sup> High-quality research is urgently needed to better inform optimal PPE use and guide the reexpansion of postpandemic clinical and endoscopic services.

## Supplementary Material

Note: To access the supplementary material accompanying this article, visit the online version of *Gastroenterology* at [www.gastrojournal.org](http://www.gastrojournal.org), and at <https://doi.org/10.1053/j.gastro.2020.04.071>.

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### CRedit Authorship Contributions

Shailendra Singh, MD (Conceptualization: Lead; Investigation: Lead; Methodology: Lead; Supervision: Lead; Writing – original draft: Lead; Writing – review & editing: Lead). Ahmad Khan, MD (Data curation: Lead; Formal analysis: Lead; Methodology: Supporting; Writing – review & editing: Supporting).

### Conflicts of interest

The authors disclose no conflicts.

## Supplementary Methods

### Study Design

This was a multicenter web-based survey study and was exempt from institutional board review. A survey was constructed within the REDCap electronic data capture platform,<sup>5,6</sup> hosted at the Medical University of South Carolina, and was subsequently disseminated to potential respondents. The survey was accessible via a direct web link (<https://gi-covid19.org/survey>) without any required login credentials. Respondents were instructed to confer with their institutional leadership prior to completing the survey. In the event surveys were completed by multiple respondents from the same institution, the investigators contacted respondents directly and asked them to reconcile their responses. At the institutional level, this was a cross-sectional analysis; however, because institutions responded at various points in time, this was not a cross-sectional study in aggregate.

### Survey Development, Validation and Beta Testing

The survey was developed through a series of electronic communications between the authors. The initial survey was designed by one investigator (BJE) and then iteratively pilot tested by the remainder of the authors to establish face and content validity and to improve factors affecting test-retest reliability, such as the clarity and order of questions, length of the instrument, and ease of administration. The near-final version of the survey was then reviewed and refined by another investigator (SBW) who had not previously commented on the instrument.

### Survey Distribution

Due to the rapidly-evolving and critical nature of the COVID-19 pandemic, and the emphasis placed on timely and transparent results as well as widespread survey distribution, the approach to dissemination was unconventional, utilizing several media. A composite list of email addresses representing gastroenterologists at numerous institutions throughout North America was developed by the study team, with an intent to maximize geographic diversity. This list ultimately comprised 187 individuals. Two *en masse* emails were sent (by BJE) to the contact list encouraging participation in the survey and including a direct link. At their discretion, four investigators (NF, ZLS, SBW, BJE) also directly contacted gastroenterologists through email, phone calls and text messages, encouraging survey participation. The survey was also promoted on the social media platform Twitter, and featured in an online editorial regarding gastrointestinal endoscopy amidst the pandemic.<sup>7</sup> Finally, respondents that had completed the survey were sent a personalized link 4 days before study closure to encourage them to update their entries.

### Survey Items

The survey consisted of 42 items, stratified into 6 categories: institutional demographics, changes in endoscopy practice, changes in GI and hepatology clinical practice, changes in training, peri-procedure screening for COVID-19, and changes in PPE practices. Based on early feedback from respondents after the initial dissemination of the survey, one additional question and three additional response options to existing questions were added. A complete list of survey questions and possible answers is provided in below.

### Publication of Intermediate Results During the Study

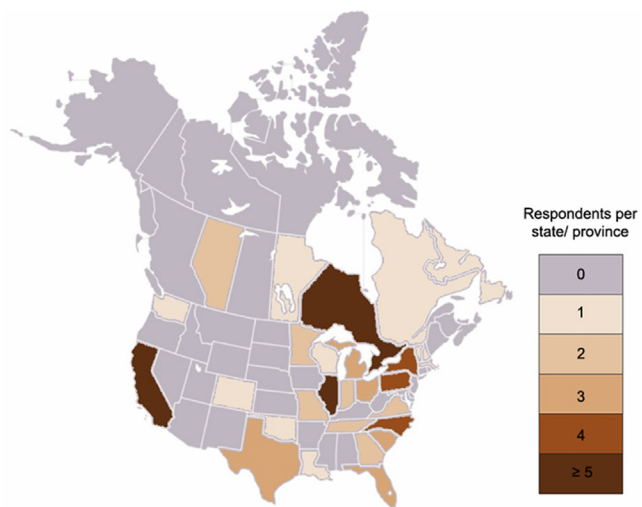
During the study period, many centers in North America remained in fluid situations regarding practice adaptations during the pandemic. Further, many centers anticipating surges in COVID-19 cases were learning from the experience of centers at which surges were already occurring. Because of the importance of real-time knowledge dissemination during these unprecedented times, the decision was made to publish the survey results, in aggregate, on three separate instances. The intermediate results were published on the survey website ([GI-COVID19.org](http://GI-COVID19.org)) and promoted on Twitter.

### Response Stratification

For subgroup analyses, responses were stratified according to 3 factors: 1) geographic region of origin, including Canada and U.S. regions of the Northeast, Mid-Atlantic, Southeast, Southwest, West, Northwest, and Midwest; 2) whether they represented teaching or non-teaching institutions, as defined by the presence or absence of a gastroenterology fellowship program; and 3) according to the time of completion, in intervals of 7 days after initial survey dissemination.

### Statistical Analysis

Individual survey item responses were reported as the proportion of total respondents engaging the question that answered affirmatively to the individual reply. For example, the number of respondents answering “yes” to the cancellation of screening colonoscopies was divided by the total number of responses to that question. For questions containing a free-text response option, attempts were made to codify these replies into *de novo* categories for analysis purposes. Comparisons of categorical answer responses within questions were performed using Chi-squared tests where appropriate. A Mantel-Haenszel test was used to assess for differences in responses based on the time between survey dissemination and response. A two-sided *p*-value of 0.05 was considered statistically significant. All analyses were performed using SPSS statistics for Mac version 25.0 (IBM Corp, Armonk, NY).



**Supplementary Figure 1.** Choropleth map demonstrating numbers of survey respondents by state and province.

<b>PREAMBLE</b>
<p>Thank you so much for responding to this important survey. Please confer with your Division Leadership prior to completing the survey to ensure that the submitted information is as accurate as possible. If duplicate responses from an institution are received, we will contact you directly to consolidate. Please update your survey response when important changes occur at your institution. Up to date results will be published every 72 hours or so. Results will be presented in aggregate; institution names will not appear.</p>
<b>INSTITUTION DEMOGRAPHIC INFORMATION</b>
<ul style="list-style-type: none"> <li>• Institution name*</li> <li>• City*</li> <li>• State or province*</li> <li>• Country*</li> <li>• Email address*</li> </ul>
<b>COVID-19 BURDEN</b>
<ul style="list-style-type: none"> <li>• How many cases of confirmed COVID-19 have been diagnosed at your institution? (if unknown, leave blank)             <ul style="list-style-type: none"> <li>○ <b>Min, 0; max, 3500; mean, 319.1; SD, 590.1; median, 96; IQR, 14–392.5(n = 44 responses)</b></li> </ul> </li> </ul>

**Supplementary Figure 2.** Survey instrument and aggregate responses (in bold). \*Qualitative responses by free text—no aggregate answers reported. IQR, interquartile range; max, maximum; min, minimum; SD, standard deviation.



- How many cases of COVID-19 are currently suspected at your institution? (if unknown, leave blank)
  - **Min, 0; max, 204; mean, 37.8; SD, 48.8; median, 18; IQR, 6.8–54.3 (n = 28 responses)**
- How many cases of confirmed COVID-19 have been diagnosed at your institution in the past 48 hours? (if unknown, leave blank)
  - **Min, 0; max, 133; mean, 16.2; SD, 29.6; median, 5; IQR, 1.5–18 (n = 27 responses)**
- Date of first confirmed case? (if unknown, leave blank)\*
- How many cases of confirmed COVID-19 have been hospitalized at your institution? (if unknown, leave blank)
  - **Min, 0; max, 397; mean, 69.3; SD, 104.1; median, 25; IQR, 5–83 (n = 37 responses)**

#### CHANGES IN ENDOSCOPY PRACTICE

- What volume of endoscopies has been performed at your institution in the past 48 hours?
  - Same as usual: **0% (0/71 responses)**
  - Approximately 75% of usual: **1.4% (1/71 responses)**
  - Approximately 50% of usual: **8.5% (6/71 responses)**
  - Approximately 25% of usual: **25.4% (18/71 responses)**
  - Less than 10% of usual: **64.8% (46/71 responses)**
- Are screening colonoscopies postponed at your institution?
  - Yes: **97.3% (71/73 responses)**

Supplementary Figure 2. Continued



- No: **2.7% (2/73 responses)**
- If yes, what date was this instituted?\*
- If yes, for how many weeks? (if unknown, leave blank)
  - **Min, 1; max, 12; mean, 6.0; SD, 2.7; median, 6; IQR, 4–8 (n = 21 responses)**
- If yes, was this a divisional or institutional decision?
  - Divisional: **16.9% (12/71 responses)**
  - Institutional: **28.2% (20/71 responses)**
  - Both: **54.9% (39/71 responses)**
- If yes, how does your unit anticipate catching up on colonoscopies later?
  - Adding weekends or evenings: **29.6% (21/71 responses)**
  - Using stool-based testing: **9.9% (7/71 responses)**
  - Hiring: **5.6% (4/71 responses)**
  - No defined plan: **64.8% (46/71 responses)**
  - Other: **9.9% (7/71 responses)** (2 free-text “other” responses also state no defined plan)
- If other, please describe\*
- Are all elective endoscopies (e.g. chronic symptom evaluation, most surveillance) postponed at your institution?
  - Yes: **98.6% (72/73 responses)**
  - No: **1.4% (1/73 responses)**
- If yes, what date was this instituted?\*
- If yes, for how many weeks? (if unknown, leave blank)

Supplementary Figure 2. Continued

<ul style="list-style-type: none"> <li>○ <b>Min, 1; max, 12; mean, 5.8; SD, 2.4; median, 6; IQR, 4–8 (n = 22 responses)</b></li> <li>• If yes, was this a divisional or institutional decision?           <ul style="list-style-type: none"> <li>○ Divisional: <b>15.5% (11/71 responses)</b></li> <li>○ Institutional: <b>26.8% (19/71 responses)</b></li> <li>○ Both: <b>57.7% (41/71 responses)</b></li> </ul> </li> </ul>
<b>CHANGES IN CLINICAL PRACTICE</b>
<ul style="list-style-type: none"> <li>• Are any ambulatory GI and/or Hepatology clinics closed at your institution?           <ul style="list-style-type: none"> <li>○ Partly closed: <b>54.8% (40/73 responses)</b></li> <li>○ Fully closed: <b>20.5% (15/73 responses)</b></li> <li>○ No: <b>24.7% (18/73 responses)</b></li> </ul> </li> <li>• If partly or fully closed, is this all clinics or only certain clinics?           <ul style="list-style-type: none"> <li>○ All clinics: <b>92.6% (50/54 responses)</b></li> <li>○ Only certain clinics: <b>7.4% (4/54 responses)</b></li> </ul> </li> <li>• If only certain clinics, which ones?*</li> <li>• Have telemedicine visits for clinic patients been instituted at your institution?           <ul style="list-style-type: none"> <li>○ Yes: <b>95.9% (70/73 responses)</b></li> <li>○ No: <b>1.4% (1/73 responses)</b></li> <li>○ Starting soon: <b>2.7% (2/73 responses)</b></li> </ul> </li> <li>• If yes, approximately what percentage of visits has been successfully conducted via telemedicine?           <ul style="list-style-type: none"> <li>○ 0-25%: <b>10.0% (7/70 responses)</b></li> <li>○ 26-50%: <b>17.1% (12/70 responses)</b></li> </ul> </li> </ul>

Supplementary Figure 2. Continued

- 51-75%: **18.6% (13/70 responses)**
- 76-100%: **47.1% (33/70 responses)**
- Unknown: **7.1% (5/70 responses)**
- If yes, is there a plan for reimbursement for telemedicine visits?
  - Yes: **97.1% (68/70 responses)**
  - No: **2.9% (2/70 responses)**
- If yes, are you seeing new patients via telemedicine?
  - Yes: **92.9% (65/70 responses)**
  - No: **7.1% (5/70 responses)**
- If yes, are you seeing return patients via telemedicine?
  - Yes: **98.6% (69/70 responses)**
  - No: **1.4% (1/70 responses)**
- Have you adopted an emergency coverage schedule for consult services at your institution to limit the number of division members in the hospital at one time?
  - Yes: **74.0% (54/73 responses)**
  - No: **26.0% (19/73 responses)**
- If yes, how many GI/Hepatology faculty are expected in the hospital on a given day?
  - **Min, 1; max, 20; mean, 3.6; SD, 3.4 (n = 49 responses)**
- If yes, how many GI/Hepatology fellows are expected in the hospital on a given day?
  - **Min, 0; max, 7; mean, 2.3; SD, 1.5 (n = 49 responses)**
- Is there an EHR-only option to address an inpatient consult?
  - Yes: **61.6% (45/73 responses)**
  - No: **38.4% (28/73 responses)**

**Supplementary Figure 2.** Continued

CHANGES IN TRAINING
<ul style="list-style-type: none"><li>• Are fellows involved in the care of consult patients?<ul style="list-style-type: none"><li>○ Yes, in-person: <b>64.4% (47/73 responses)</b></li><li>○ Yes, only via chart review: <b>19.2% (14/73 responses)</b></li><li>○ No: <b>2.7% (2/73 responses)</b></li><li>○ We do not have fellows: <b>13.7% (10/73 responses)</b></li></ul></li><li>• Are fellows still seeing patients in ambulatory clinic?<ul style="list-style-type: none"><li>○ Yes, primarily in-person: <b>4.2% (3/72 responses)</b></li><li>○ Yes, only via chart review: <b>54.2% (39/72 responses)</b></li><li>○ No: <b>29.2% (21/72 responses)</b></li><li>○ We do not have fellows: <b>12.5% (9/72 responses)</b></li></ul></li><li>• Are fellows involved in endoscopy?<ul style="list-style-type: none"><li>○ Yes: <b>8.3% (6/72 responses)</b></li><li>○ Yes, selected cases: <b>36.1% (26/72 responses)</b></li><li>○ No: <b>43.1% (31/72 responses)</b></li><li>○ We do not have fellows: <b>12.5% (9/72 responses)</b></li></ul></li><li>• Are interventional endoscopy fellows still performing advanced/therapeutic cases?<ul style="list-style-type: none"><li>○ Yes: <b>9.7% (7/72 responses)</b></li><li>○ Yes, selected cases: <b>25.0% (18/72 responses)</b></li><li>○ No: <b>29.2% (21/72 responses)</b></li><li>○ Not applicable: <b>36.1% (26/72 responses)</b></li></ul></li></ul>
SCREENING FOR COVID-19 PRIOR TO AND AFTER ENDOSCOPY

Supplementary Figure 2. Continued

- Are patients prescreened for COVID-19 on arrival to endoscopy?
  - Yes: **86.3% (63/73 responses)**
  - No: **13.7% (10/73 responses)**
- If yes, by whom?
  - Registration: **47.6% (30/63 responses)**
  - Dedicated intake staff: **50.8% (32/63 responses)**
  - Endoscopy unit nurses: **50.8% (32/63 responses)**
  - Physicians: **12.7% (8/63 responses)**
- If yes, what questions are asked?
  - Fever: **100.0% (63/63 responses)**
  - Respiratory symptoms: **95.2% (60/63 responses)**
  - Cough: **95.2% (60/63 responses)**
  - Sore throat: **65.1% (41/63 responses)**
  - Fatigue: **39.7% (25/63 responses)**
  - Diarrhea: **42.9% (27/63 responses)**
  - Recent travel to high-risk area: **90.5% (57/63 responses)**
  - Recent airplane travel: **61.9% (39/63 responses)**
  - Known exposure to suspected or confirmed COVID-19: **95.2% (60/63 responses)**
  - Sick contacts in general: **49.2% (31/63 responses)**
- Is the **patient's**body temperature taken on arrival to endoscopy?
  - Yes: **86.3% (63/73 responses)**
  - No: **13.7% (10/73 responses)**

**Supplementary Figure 2.** Continued

- Have there been any positive screens?
  - Yes: **36.6% (26/71 responses)**
  - No: **35.2% (25/71 responses)**
  - Unknown: **28.2% (20/71 responses)**
- Has there been any COVID-19 exposure in endoscopy or clinic from a patient?
  - Yes: **11.0% (8/73 responses)**
  - Probable: **6.8% (5/73 responses)**
  - Possible: **9.6% (7/73 responses)**
  - No: **46.6% (34/73 responses)**
  - Unknown: **26.0% (19/73 responses)**
- Has there been any COVID-19 exposure in endoscopy or clinic from a patient's escort?
  - Yes: **0.0% (0/73 responses)**
  - Probable: **0.0% (0/73 responses)**
  - Possible: **5.5% (4/73 responses)**
  - No: **47.9% (35/73 responses)**
  - Unknown: **46.6% (34/73 responses)**
- Have any procedures been canceled to evaluate a patient for COVID-19 based on prescreening questions?
  - Yes: **51.4% (37/72 responses)**
  - No: **30.6% (22/72 responses)**
  - Unknown: **18.1% (13/72 responses)**
- Are patients called up to 14 days after endoscopy to ask about new diagnosis or development of symptoms of COVID-19?

**Supplementary Figure 2.** Continued

- Yes: **21.9% (16/73 responses)**
- No: **56.2% (41/73 responses)**
- Unknown: **21.9% (16/73 responses)**

#### CHANGES IN PERSONAL PROTECTION PRACTICES

- Do you have any negative pressure rooms in your endoscopy unit?
  - Yes: **71.2% (52/73 responses)**
  - No: **28.8% (21/73 responses)**
- In what instances is PPE used in your endoscopy unit?
  - All procedures: **86.3% (63/73 responses)**
  - Suspected COVID-19 patients: **6.8% (5/73 responses)**
  - Known COVID-19 patients: **5.5% (4/73 responses)**
  - It is not used for any patients: **1.4% (1/73 responses)**
- Are you concerned about your unit's supply of PPE in the event of a case surge?
  - Yes: **86.1% (62/72 responses)**
  - No: **13.9% (10/72 responses)**
- What PPE strategy is currently employed in your unit for ALL PATIENTS? Check all that apply:
  - Hairnet: **67.1% (49/73 responses)**
  - Surgical mask: **76.7% (56/73 responses)**
  - N95 mask or FFP2-3 respirator: **58.9% (43/73 responses)**

Supplementary Figure 2. Continued



- Protective hood: **12.3% (9/73 responses)**
  - Face shield/ goggles: **94.5% (69/73 responses)**
  - Shoe covers: **47.9% (35/73 responses)**
  - Double gloves: **54.8% (40/73 responses)**
  - None: **0.0% (0/73 responses)**
  - No defined local guidance/ strategy yet: **2.7% (2/73 responses)**
- What PPE strategy is currently employed in your unit for PATIENTS WITH SUGGESTIVE SYMPTOMS OF COVID-19 BUT NO KNOWN DIAGNOSIS OR HIGH-RISK EXPOSURE? Check all that apply:
  - Hairnet: **75.3% (55/73 responses)**
  - Surgical mask: **58.9% (43/73 responses)**
  - N95 mask or FFP2-3 respirator: **87.7% (64/73 responses)**
  - Protective hood: **19.2% (14/73 responses)**
  - Face shield/ goggles: **91.8% (67/73 responses)**
  - Shoe covers: **56.2% (41/73 responses)**
  - Double gloves: **72.6% (53/73 responses)**
  - None: **0.0% (0/73 responses)**
  - No defined local guidance/strategy yet: **2.7% (2/73 responses)**
- What PPE strategy is currently employed in your unit for HIGH-RISK OR CONFIRMED COVID-19 PATIENTS? Check all that apply:
  - Hairnet: **78.1% (57/73 responses)**
  - Surgical mask: **57.5% (42/73 responses)**
  - N95 mask or FFP2-3 respirator: **91.8% (67/73 responses)**

**Supplementary Figure 2.** Continued

<ul style="list-style-type: none"> <li>o Protective hood: <b>27.4% (20/73 responses)</b></li> <li>o Face shield/ goggles: <b>94.5% (69/73 responses)</b></li> <li>o Shoe covers: <b>63.0% (46/73 responses)</b></li> <li>o Double gloves: <b>76.7% (56/73 responses)</b></li> <li>o None: <b>0.0% (0/73 responses)</b></li> <li>o No defined local guidance/ strategy yet: <b>1.4% (1/73 responses)</b></li> <li>• Are you reusing N95 masks or FFP2-3 respirators? <ul style="list-style-type: none"> <li>o Yes: <b>76.1% (54/71 responses)</b></li> <li>o No: <b>18.3% (13/71 responses)</b></li> <li>o We don't have access to any: <b>5.6% (4/71 responses)</b></li> </ul> </li> <li>• Are you reusing surgical masks? <ul style="list-style-type: none"> <li>o Yes: <b>52.1% (37/71 responses)</b></li> <li>o No: <b>47.9% (34/71 responses)</b></li> <li>o We don't have access to any: <b>0.0% (0/71 responses)</b></li> </ul> </li> <li>• Are escorts being brought to the prep and recovery bay? <ul style="list-style-type: none"> <li>o Yes: <b>9.7% (7/72 responses)</b></li> <li>o Yes, only if younger and healthy with no positive prescreening questions: <b>6.9% (5/72 responses)</b></li> <li>o No: <b>83.3% (60/72 responses)</b></li> </ul> </li> <li>• Are peroral procedures being routinely intubated at your institution as a COVID-19 precaution? <ul style="list-style-type: none"> <li>o Yes: <b>27.4% (20/73 responses)</b></li> <li>o No: <b>72.6% (53/73 responses)</b></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Are any other special anesthesia precautions being taken?*</li> </ul>
<b>MISCELLANEOUS</b>
<ul style="list-style-type: none"> <li>• Is your division or unit doing anything not covered above that might be helpful to others?*</li> <li>• How can we improve this survey?*</li> </ul>